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BEES VISITING HELIANTHUS.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

The genus *Helianthus*, consisting of the annual and perennial sunflowers, is native only in America, though widely cultivated in the Old World. The common sunflower, *H. annuus*, is wholly sterile with its own pollen, and has to be visited by insects in order to produce seed. Presumably the same is true of the other species of the genus. The insects carrying the pollen are various, but the bees are far more important than all the rest combined; their incessant activity can only be appreciated by one who has worked with sunflowers throughout the summer.

At Goodview, Colorado, August 2, 1913. I took a census of insects on flowers of cultivated *H. annuus* (var. *coronatus*) for a short time, with this result: *Andrena helianthi*, 12; *Halictoides marginatus* (perhaps some were *Halictus*), 9; *Halictus armaticeps*, 4; *Melissodes*, 2 ♂, 1 ♀; *Panurginus innuptus*, 1; *Apis mellifera ligustica*, 1; *Syrphid*, 1. These were recognized as they flew, but on July 18, I collected a series of bees from the same flowers, at the same place, and found I had *Andrena helianthi* Rob., *Halictus armaticeps* Cress., *Halictoides marginatus* (Cr.), *Panurginus innuptus* (Ckll.), both sexes, *Melissodes aurigenia* Cress., ♀, *M. confusiformis* Ckll., ♀, and *Megachile agustini* Ckll., ♂.

The domesticated honey-bee, belonging to the Old World genus, is here an insignificant factor in sunflower pollination. Mr. Collins of Boulder, who has many hives of bees, informs me that they do not go to sunflowers unless the supply of other nectar runs short. When they do make honey from sunflowers, it is very yellow.

The most important sunflower bee, with us, is certainly *Andrena helianthi*. In some localities it is probable that the species of *Megachile*, which work fast and carry a lot of pollen, do more work. *M. helianthi* Ckll. was collected by Rohwer on the wild sunflower (*Helianthus annuus lenticularis*) at Boulder, Colorado.

Various species of *Megachile* have been recorded elsewhere. It will be observed that in Texas the species of *Nomia* become quite conspicuous. In New Mexico *N. triangulifera* Vachal occurs on *Helianthus*.

Do the bees distinguish the annual and perennial sunflowers, or between the species of either group? Are there species of bees adopted to particular species of *Helianthus*? At present we cannot produce any satisfactory evidence on this point; differences observed may be no more significant for the discussion than those between the visitors of the same species (*H. lenticularis*) in different regions. Robertson, in Illinois, finds *Andrena helianthi* Rob., *A. pulchella* Rob., and *A. aliciae* Rob., on perennial sunflowers. At Boulder we get only one of these on the annual species, *A. helianthi*; but in New Mexico *A. pulchella* appears on *H. lenticularis*. In the vicinity of Milwaukee, Wis., Graenicher gets four species of *Andrena* on sunflowers; *A. helianthi* Rob. (the most common), *A. aliciae* Rob., *A. peckhami* Ckll., and *A. clypeonitens* Ckll. These all visit perennial species.

In view of the fact that *Helianthus* is exclusively American, and possesses in our fauna a long series of more or less adapted bee-visitors, it becomes very interesting to enquire what happens when sunflowers are grown in the Old World. Do the bees of those regions find them out, and if so, are they allied to the regular American sunflower bees?

Aljken, in Bremen (Abh. Nat. Ver. Bremen, XXII, pp. 180-181) observed the bees visiting cultivated *H. annuus*. His list is as follows: *Bombus*, 8 species; *Psithyrus*, 3 species, all males; *Megachile*, 2 species, females; *Halictus leucozonius*; *Coelioxys acuminatus*; *Apis mellifera*; *Anthidium manicatum*. It will be seen at once that this closely corresponds in character with American lists, leaving out the genera peculiar to America, and also certain genera, as *Andrena*, our species of which appear to be oligotropic.

The perennial sunflowers in European gardens are visited by *Apis*, *Bombus*, *Psithyrus*, *Halictus*, *Megachile* and *Heriades*.

In Australia, Mrs. M. Anderson collected bees for me from flowers of *H. annuus*, and it was very interesting to find that

Trigona carbonaria Sm. freely visits them, collecting pollen. No species of *Trigona* occurs within the natural range of the *H. annuus* group.

At Gisborne, New Zealand, Mr. W. D. Cook kindly observed the insects on *H. annuus coronatus* in 1913-14. He did not send any specimens, but his account is sufficiently clear to permit the recognition of the bees, and I have inserted the names within brackets:—

"There seem to have been very few bees about this year; at any rate very few visited the sunflowers. I noticed a few ordinary German bees [*Apis mellifera* L.], a few bumble-bees, and a tremendous number of the common cream-coloured moth, and also a great many flies. [The bees] were nearly all a small black bumble-bee. There seem to be very few big bumble-bees about here (I mean the black one with the yellow band [*Bombus terrestris* L.]), but the one I saw most was about half the size and pure black (much larger than an ordinary bee)" [*Bombus ruderalis fidens* Harris.]

Thus in New Zealand the only bee-visitors were the introduced species of *Bombus* and *Apis*, as might be expected from the absence of native long-tongued bees. Had the sunflower reached that country before the bees, perhaps the flies would have been fairly satisfactory pollinators.

I add to this paper descriptive notes on some sunflower bees, two of which are new.

***Melissodes semiagilis* (Cockerell).**

Melissodes agilis semiagilis Cockerell, Ann. Mag. Nat. Hist., April 1906, p. 364, ♂.

♀. Length about 11 mm.; pubescence grayish-white, tinged with ochreous, vertex with black hairs, scutellum and posterior part of mesothorax with much black hair, the tegulae separated from the black patch by a band of pale hair about equal to their width; head broad; flagellum dusky reddish beneath, except at base; first abdominal segment with a narrow pallid hind margin, the others with hind margin dark; second segment with pale hair at extreme base, and a rather broad median hair band; third segment with median band twice as broad as that on second; tibia of hind

legs with scopa strongly plumose, long and loose, wholly pale; hair on inner side of hind tibiae fusco-ferruginous.

In my table in Trans. Amer. Ent. Soc., XXXII, the female runs to the vicinity of *M. gilensis communis* and *hortivagans*. It is smaller than *gilensis*, with much clearer wings, and hair on outer side of middle tibiae all pale (largely dark gray in *gilensis*). The same characters at once separate it from *hortivagans*. The wings are much paler and shorter than in *communis*, and the band on middle of second abdominal segment is much broader. The hind margin of fourth abdominal segment has dark hair only in middle, not right across as in *M. wheeleri*. Among Robertson's species *M. semiagilis* female resembles *M. vernonia*, which has short, still clearer wings; but *vernonia* has a patch of black hair on outer side of middle tibiae apically, the hair on abdomen whiter, and the hair on inner side of hind basitarsi black.

Hab.—Quanah, Indian Territory, at flowers of *Helianthus*, June 10, 1906 (*J. D. Mitchell*), U.S. Nat. Museum, 9♂, 4♀. A female from Dallas, Texas, at *Helianthus*, Sept. 22, 1905 (*F. C. Bishopp*) has a little dusky hair at apex of middle tibiae, and the hair on inner side of hind basitarsi is fuscous; but the general appearance and colour of the hair agrees exactly with *semiagilis*, not with *vernonia*. Thus it rather approaches *M. simillima* Rob.

***Melissodes suffusa* Cresson, variety.**

♂. Differs from a cotype in having the flagellum only obscurely reddened (instead of bright clear ferruginous) beneath; otherwise normal.

Hab.—Falfurrias, Texas, on *Helianthus*, May 18, 1907, (*A. C. Morgan*).

***Melissodes bishoppi* sp. n.**

♂. Runs in my table in Trans. Amer. Ent. Soc., XXXII, to the vicinity of *M. aurigena* Cresson, which it closely resembles differing as follows: Third antennal joint (view from front) 192 μ long, fourth 752 (the same measurements for *aurigena* are 128 and 1040); the third joint very much longer than second; flagellum about $5\frac{1}{2}$ mm. long (about $7\frac{1}{2}$ in *aurigena*); nervures darker; second s. m. narrower; third t. c. angular in middle;

hind knee-plate larger; hair of hind tibiae whiter and less spreading; first two abdominal segments very distinctly punctured; subhyaline margins of segments less than half as wide. Clypeus, labrum and large spot on mandibles yellow; hair of thorax above wholly pale ochraceous; flagellum entirely red, bright beneath, a little dusky above; small joints of tarsi red; hair on fifth and sixth abdominal segments light; wings as clear as in *aurigena*. The abdomen is without hair-bands. Tegulae light fulvous. Eyes dark brown.

Hab.—Paris, Texas, at *Helianthus*, Aug. 27, 1905 (F. C. Bishopp), U. S. National Museum. The *M. aurigena* compared is a cotype from New York.

***Xenoglossodes helianthorum* sp. n.**

♂. Length about 10 mm.; black, with abundant pure white hair, light orange on inner side of basitarsi; head broad; eyes greyish-brown; clypeus (except upper third), labrum and basal half of mandibles cream-colour; apical half of mandibles ferruginous; head and thorax with dense long hair; antennae reaching the second abdominal segment; third and fourth joints (from front) measuring respectively about 160 and 1120 μ ; flagellum dark rufous, redder beneath, but not brightly coloured; mesothorax shining, well punctured; tegulae almost wholly hidden by hair, their margins pallid; wings short, hyaline, with ferruginous nervures and stigma; second s. m. very large and broad; small joints of tarsi ferruginous; abdomen entirely covered with white hair, long at base, otherwise short, denser on apical margins of segments, producing obscure bands; subapical lateral spines very small; short fuscous hair on each side of apical part of apical plate; last ventral segment with two large oval depressions.

Hab.—Falfurrias, Texas, at *Helianthus*, May 18, 1907 (A. C. Morgan). U. S. National Museum. I have not ventured to extract the mouth-parts of the unique type, but refer the insect with confidence to *Xenoglossodes*, where it falls near *X. albata* (Cress.), differing by being larger and more robust, with upper part of clypeus black.

LUCILIA SERICATA MEIGEN ATTACKING A LIVE CALF.*

BY H. F. HUDSON, B.S.A., ENTOMOLOGICAL BRANCH, OTTAWA.

While walking through a pasture field at Strathroy, Ont., on July 1st, my attention was directed to a well-bred herd of young Holstein cattle. There were among them twelve calves from five to six weeks old. On looking them over, I noticed that one of the calves had a sickly appearance and was extremely thin. This calf appeared to be suffering from an acute attack of white scours, and all known remedies seemed to be useless. It was becoming weaker although still able to run around, and was very keen for its milk. On July 4th, when I saw the calf again, I was surprised to find the hind extremities, especially around the base of the tail, a mass of maggots. A closer examination showed that the maggots were most abundant around the anus and base of the tail where some of them had eaten into the flesh to the depth of about a quarter of an inch. No adult flies were observed though a watch was kept for some time. Learning the calf's condition, the owner killed it immediately and a piece of the infested flesh was brought to the laboratory. On July 12th the larvæ appeared to be thriving, but as other work compelled an absence of about a fortnight from the laboratory at Strathroy, most of the larvæ died through want of food during this absence. Two larvæ pupated on August 5th, and on August 19th two adults of *Lucilia sericata* Meigen emerged. The specimens were dwarfed owing to the larvæ having suffered from lack of nutrition.

The adult flies had no doubt been attracted by the filthy hind quarters of the sickly calf and had oviposited there. Dr. C. Gordon Hewitt, to whom the specimens were submitted, states that *L. sericata* is the chief fly which produces the maggots on the backs and hind quarters of sheep in Great Britain, as MacDougall has shown. Such a case of myiasis occurring in cattle, however, is very unusual.

*Contributions from the Entomological Branch, Department of Agriculture, Ottawa.

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A NEW SARCOPHAGID SCAVENGER FROM MONTANA.*

BY RALPH R. PARKER, M.S., AMHERST, MASS.

Sarcophaga cooleyi, n. sp.

Plate XXVI; figures 1, 2, 3 and 4.

Type, ♂ and ♀: Massachusetts Agricultural College.

Paratypes, ♂ and ♀: Massachusetts Agricultural College, four; United States National Museum, four; Montana Agricultural Experiment Station, six; collection of Dr. J. M. Aldrich, two; collection of writer, eight.

This species is rendered especially easy to separate from other North America members of the genus by the lack of marginal bristles on the third abdominal segment. *S. kellyi*, a much smaller species recently described by Prof. J. M. Aldrich (Journal of Agricultural Research, vol. 2, No. 6, Sept. 1914, pp. 443-445) is the only other native species with which the writer is acquainted that also lacks these bristles. The two species are at once differentiated by the presence of presutural acrostichal bristles and three rows of black cilia behind the eyes in *S. kellyi* Ald., while *S. cooleyi* lacks these bristles and has but two rows of cilia. Of the males *S. kellyi* has a grayish pollinose first genital segment, tinged with the reflecting colours of the abdomen, but the corresponding segment of *S. cooleyi* is dull orange, at most slightly grayish pollinose anteriorly. The female of *kellyi* has three sternopleurals, that of *cooleyi* four.

Length: 7 to 13 mm.; average 10 to 12 mm.

Male Head:—Viewed from side parafrontals and genæ with dark reflections. Breadth of front at narrowest part about three-fifths eye width; cheek height approximately one-half that of eyes. Front prominent, upper inner orbits of eyes converging downward; sides of frontal vitta not drawn in at base and usually converging backward by slight curves. Second antennal segment dark, its tip sometimes slightly brownish; third segment two and one-half times length of second; arista plumose on basal one-half to two-thirds. Back of head somewhat convex, with two rows of black cilia behind eyes, otherwise clothed with whitish, silvery white, or sometimes faintly yellowish hair. Cheeks clothed with black

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hair. That half of genæ nearest eye-orbits with scattered hairs arranged in two or three irregular rows, a few stouter ones just above transverse impression. Palpi dark.

Chatolaxy.—Lateral verticals absent; vibrissæ inserted just above line of oral margin.

Thorax.—Vestiture of metanotum consisting of short, slightly reclinate, bristly hairs. Sutural ridge with a few scattered hairs behind last notopleural bristle. Hairs covering anterior spiracle mostly yellowish gray, but their bases dark forming an irregular band; those on anterior margin of posterior spiracle dark brown; spiracular cover pale yellowish. Epaulets dark.

Wings.—Bend of fourth vein normally a little less than a right angle; anterior cross-vein much more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section V of costa about one half length of section 3; alulae fringed with hair; calyptæ whitish, outwardly fringed with white hair.

Legs.—Dark. Posterior trochanter hairy, without a distinct "brush"; in profile a slender spine can often be seen distally on the ventral surface but is usually obscured by hair and may be absent; femur sub-spindle shaped, sometimes very slightly arched, clothed beneath with long, fine hairs that both anteriorly and posteriorly form a sort of beard, anterior face with three rows of bristles, those of the intermediate row short and stout, not present distally; tibia usually slightly curved, anterior and posterior faces each with a beard of equally dense, long, coarse, black hairs on distal four-fifths; tarsus shorter than tibia, the fourth segment longer than one-half-fifth. Middle coxa with a single row of bristles; femur clothed beneath on proximal one-half to two-thirds with a beard-like growth of long, fine hairs, anterior ventral row of short, scattered bristles complete, posterior row represented only by a distal comb extending proximally to the long hair. Anterior coxa with two rows of bristles.

Chatolaxy.—Anterior dorsocentrals strongly reclinate, but projecting well above short vestiture of prescutum; acrostichals absent, though most posterior pair is rarely weakly developed; inner presuturals absent, or if present inconspicuous; four or five pairs of postsutural dorsocentrals, two posterior pairs that are long

and two or three anterior that are short and weak; prescutellar acrostichals present; scutellar apicals present; three sternopleurals; lower sternopleurals consisting of a single row of strong bristles and numerous other irregularly placed bristles anterior to it.

Abdomen.—Somewhat conical, clothed above with short decumbent bristles, beneath with short almost erect hair. Ventral plates, as a whole, with their sides converging posteriorly, the first bearing long erect hairs, vestiture of second and third short and decumbent except at sides and posterior margin, first usually trapezoidal, its sides slightly converging posteriorly. Fourth plate prominent, in profile its base with a large somewhat conical elevation posteriorly, posterior inner edges of lamellæ bent inward and each with a "brush" of very densely set, short, stout, blunt spines on proximal half.

Chaetotaxy.—Second and third segments without marginal bristles, fourth with a complete row ending ventrally at forward turn of margin.

Genital Segments.—Prominent, dull orange. First, usually concealed, to just beyond "humps"; in profile slightly convex; faintly yellowish pollinosæ dorsally, anterior portion including "humps" sometimes slightly darkened, rarely the entire segment; clothed with short hair, "humps" bare; marginal bristles present, three to five on each side of centre; second, rotund, not flattened; vestiture longer than that of first; anal area of medium size, extending upward at least to centre of posterior surface. Forceps darkened, inner edges of prongs approximated to about the middle then slightly separated; tips blackish, bent forward and slightly spread apart; clothed with short hair nearly to prong tips, longest at sides; base with upward flap-like extensions.

Genitalia.—Head of penis large, distinctly marked off from base on posterior surface by a narrow band of membrane. Accessory plates hairy.

(♀) Females differ from males in the following important points:

Head.—Breadth of front at narrowest part slightly greater than eye width. Inner orbits of eye on upper part of front diverging downward.

Chaetotaxy.—Lateral verticals and two orbital bristles present.

Thorax.—Sutural ridge bare.

Wings.—Angle formed by bend of fourth vein slightly more acute than in male.

Legs.—Vestiture throughout of short hair. Spine of posterior trochanter distinct, anterior face of femur with but two rows of bristles, an upper and lower, a few bristles proximally and posteriorly on ventral face. Middle femur with "comb".

Chaetotaxy.—Scutellar apicals absent; four sternopleurals; lower sternopleurals fewer and anterior ones more distinctly bristly.

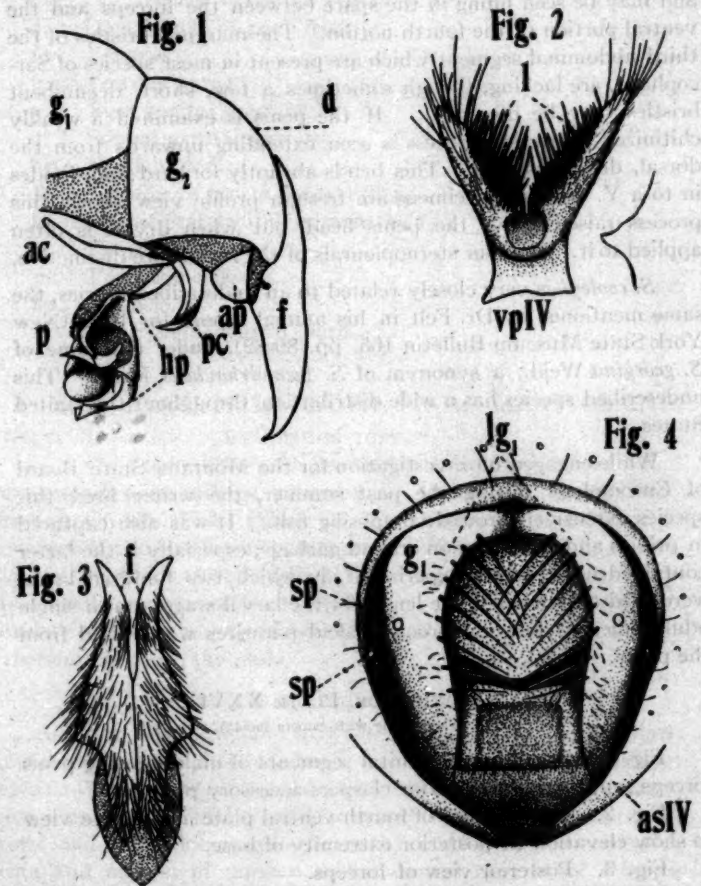
Abdomen.—Oval; vestiture throughout of short reclinate bristles. Posterior margins of ventral plates each with a row of bristles.

Genital Segments.—Protuberant. First segment consisting of two lateral lips that converge dorsally meeting in a slight depression and ventrally are separated by fifth ventral plate which they sometimes overlap, on dorsal half their edges with a row of close set, strong bristles that converge backward and downward, tips of uppermost usually crossing, each bears short hairs just in front of posterior edge, spiracles slightly above centre. Spiracles of fifth segment plainly visible.

Described from 13 ♂ and 13 ♀ specimens. About 500 examined.

Range.—Collected at Laurel and in the Bridger Mountains, Montana.

The colour of the parafrontals and genæ is usually faintly aurichalceous, sometimes silvery gray, the deeper reflections when viewed from the side vary from brown to deep gray. In a single male specimen the lateral vertical bristles were weakly developed. The abdomen of ♂ often appears more oval than conical, but the latter is more typical. Ordinarily the vestiture of the second ventral plate is decumbent like that of the third, but occasionally may be a little more erect. As seen when the abdominal segments are in their normal position the sides of the second and third ventral plates appear almost straight, but when the segments are separated, as so often happens when the genital segments are being pulled forth and fixed in position, these two plates are fully exposed; they then appear subcircular. The membranous area at



SARCOPHAGA COOLEYI, N. SP.

the base of the lamellæ of the fourth ventral plate is very prominent forming the posterior face of the somewhat conically raised extremity of the base. The "brushes" of the lamellæ are prominent even when the genital segments are in their normal position, and may be seen filling in the space between the forceps and the ventral portion of the fourth notum. The marginal bristles of the third abdominal segment which are present in most species of *Sarcophaga*, are lacking, though sometimes a few, short, decumbent bristles may be discerned. If the penis is examined a weakly chitinized projecting process is seen extending upwards from the dorsal, distal portion. This bends abruptly forward and divides in to a Y. When specimens are fresh, a profile view shows this process raised above the penis head, but when dry it is often applied to it. The four sternopleurals of the female are distinctive.

S. cooleyi is very closely related to an undescribed species, the same mentioned by Dr. Felt in his annual report for 1912 (New York State Museum Bulletin 165, pp. 80-82), under the name of *S. georgina* Weid., a synonym of *S. hamorrhoidalis* Meig. This undescribed species has a wide distribution throughout the United States.

While engaged on investigation for the Montana State Board of Entomology during the past summer, the writer bred this species extensively from decomposing fish. It was also captured in privies and was common around garbage, especially if the latter contained fish. In one experiment, in which two hundred larvæ were used to determine the length of the larval stages, not a single adult emerged but numerous chalcid parasites were raised from the pupæ.

EXPLANATION OF PLATE XXVI.

(All drawings made with camera lucida).

Fig. 1. Side view of genital segments of male showing penis forceps, anterior and posterior claspers accessory plate.

Fig. 2. Ventral view of fourth ventral plate and profile view to show elevation at posterior extremity of base.

Fig. 3. Posterior view of forceps.

Fig. 4. Genital segments of female (made from a specimen with genital segments partly expanded).

- ac. Anterior claspers.
ap. Accessory plate.
as IV. } Fourth and fifth abdominal segments.
as V. }
bvp. IV. 'Brush' of fourth ventral plate.
d. Dorsal limit of anal area.
f. Forceps.
fpg. Forceps prong.
g. 1. First genital segment.
g. 2. Second genital segment.
hp. Head of penis.
l. Lamellæ of fourth ventral plate.
lg. 1. Lips of first genital segment (♀).
p. Penis.
pc. Posterior claspers.
sp. Spiracle.
vp. IV. Fourth ventral plate.

A NEW ELACHISTID MOTH FROM MANITOBA.*

BY ARTHUR GIBSON,

Chief Assistant Entomologist, Department of Agriculture, Ottawa.

Among some micros collected at Aweme, Man., by Mr. Norman Criddle, Field Officer of the Dominion Entomological Service, are two specimens of a species of *Heliodines*, of the family Elachistidæ, which is undescribed. The specimens were reared by Mr. Criddle from larvæ found feeding on *Oxybaphus nyctagineus*, a widely occurring representative of the *Nyctaginaceæ* in Canada. I therefore propose the name:

Heliodines nyctaginella, sp. nov.

Antennæ dark metallic grayish-purple. Palpi pale yellow, tipped with black. Face, head and thorax blackish, shining; thorax with greenish reflections. Fore-wings bright golden-orange, with nine metallic bluish-gray, more or less elongate, spots, six costal and three dorsal, all edged with black basally. Base of costa and margin of dorsum to first dorsal spot black. Space

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between first and second costal spots mostly black, particularly at costa and not so wide as space between third, fourth, fifth and sixth spots, which are equidistant. The first dorsal spot is opposite the space between the second and third costal spots, the second dorsal between the third and fourth costal spots and the third dorsal between the fourth and fifth costal spots; apex from last costal spot and edge of dorsum to last dorsal spot black. In this margin of black there is a conspicuous band of metallic blue-gray scales. Cilia brown. Hind wings bronzy-brownish; cilia brown. Abdomen and legs blackish with bronzy-green reflections.

Alar expanse 10 mm.

Habitat:—Aweme, Man., July, 1913 (Norman Criddle). Type deposited in collection of Entomological Branch, Department of Agriculture, Ottawa; paratype deposited in U.S. National Museum, Washington.

As to the placing of the species in the genus *Heliodines*, Mr. Busck, who kindly examined the specimens, states that "the species may be described as *Heliodines*, though differing from the type of this genus *H. roesella* Linn., of Europe, in having the apical veins in forewings separate, not stalked. In this character the species agrees with the closely allied genera *Lamprolophus* Busck, and *Embola* Walsm., but both of these have pectinated posterior tibiae and this character has probably more weight in this group than the slight difference in the venation."

H. nyctaginella has smooth tibiae like *H. roesella*. It comes nearest to *H. albaciliella* Busck, being nearly identical in markings but much smaller and without the white cilia in the hind wings.

During the past season Mr. Criddle sent me larvæ of *H. nyctaginella*, from which the following note was made:

Mature Larva—Length 6 mm., dull green, darker dorsally. Thoracic shield black, pale stripe in centre. Anal shield blackish. Tubercles blackish each in a pale circle; single-haired; setæ dark. Feet pale. Head pale brown, marked outwardly with black.

The first moth emerged July 17, and others up till July 24. These specimens have been compared with the type and no apparent variation occurs.

THREE NEW SPECIES OF TRYPETIDÆ FROM COLORADO.*

BY F. L. THOMAS, AMHERST, MASS.

While working upon the Trypetidæ of New England, I had the opportunity of examining much western material. In that loaned by Mr. Charles W. Johnson, Curator of the Boston Society of Natural History, there were three specimens from Colorado, which are described below as new species. The types are located in Mr. Johnson's private collections.

Eutreta simplex, n. sp.

Type—One female from Colorado.

Brown; face without black spots. Wings broad, reticulate, with a white crescent seaming the tip. Scutellum with four bristles. Posterior basal cross-vein obtusely angled; small cross-vein two-thirds along the discal cell; third vein with bristles on the under surface of the wing. Length ♀ 6.5 mm., wing 5 mm.

Head—Front pale brown, slightly tapering, and about one-third the width of the head. Three lower frontals; the second pair of upper frontals, the post-vertical and outer vertical bristles white; cilia of the posterior orbit consisting of coarse white and fine black bristles. Epi-cephalon (that portion above the neck) yellow and dark brown, the remainder of the cephalon lighter brown. Eyes large, oval, with no traces of any transverse stripes. Cheeks narrow with brown bristles. Oral margin projecting and slightly arcuate. Face pale yellow without black spots, hollowed. Antennæ yellowish brown, reaching nearly to the oral margin; third segment with distinct but not a sharp anterior corner; second segment with a distinct pale spine. Arista with black bristle and brown base.



Fig. 33—*Eutreta simplex*, wing.

Thorax—Brown; blackish on the notum, metanotum, and sternopleuræ. Short hair whitish; bristles dark brown. First pair

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of dorso-central bristles close to the transverse suture. Scutellum bearing four bristles, the apical pair being weaker. Halteres yellow.

Abdomen—Brown, becoming darker toward the posterior; the anterior lateral portions are yellowish. Short hair whitish. Macrochaetae black and prominent; Genital segment broad, flat, and yellowish, with a short dark brown stripe on the middle of the base; as long as the last two abdominal segments taken together.

Legs—Yellowish brown with a dark stripe on the under side of each of the hind femora. Fore femora not thickened. Hind tibiae with short strong bristles. Bristles black.

Wings—Broad, reticulate with a white crescent seaming the tip from the second vein to near the middle of the second posterior cell. The reticulation is made up of nearly uniform hyaline dots rather evenly scattered, but wanting in that part of the grayish-brown color which adjoins the white crescent. Stigma darker with two small light coloured spots, the one in the apex being larger and more noticeable. Second vein with a slight convexity above the small crossvein.

Hab—Sunset, Colo., July 13, 1913; collected by Van Duzee at an altitude of 8,000 feet.

This specimen closely resembles *Eutreta sparsa*, but differs principally in not possessing black spots on the face, in having larger hyaline spots on the wing with a light coloured spot in the stigma and without a small clear stripe at the tip of the first longitudinal vein.

***Acidia johnsoni*, n. sp.**

Type—One female from Colorado,

Head pale yellow; thorax and legs yellowish gray; abdomen black with posterior borders of the segments yellow. Wings banded with dark brown; the spaces whitish hyaline. Scutellum with two bristles. Posterior basal cross-vein obtusely angled. Small cross-vein slightly beyond the middle

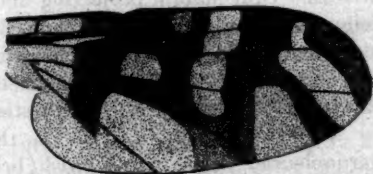


Fig. 34—*Acidia johnsoni*, wing.

of the discal cell. Third vein without bristles. Length, ♀ 5 mm., wing 4 mm.

Head—Front tapering, but more than one-third the width of the head. Two weak lower frontals; all bristles and hair of the insect are pale yellow or white. Cheeks rather broad. Oral margin slightly projecting and strongly arcuate. Face whitish with shallow antennal grooves. Antennæ missing.

Thorax—Gray; bristles and short hair yellowish. First pair of dorso-central bristles about one-fourth from the transverse suture to the scutellum. The latter is flat and bears two bristles. Metanotum shining black. Halteres yellow.

Abdomen—Black, the posterior borders of the separate segments yellow. On the median line of the last abdominal segment the yellow colour approaches half way to the base. Macrochaetae white and short. Genital segment shining black, heavy conical, constricted, as long as the last two abdominal segments taken together.

Legs—Coxae yellowish gray; femora gray, yellowish at the tips; tibiae and tarsi yellow. Hind tibia without a distinct row of short strong bristles.

Wings—Distal portion of wings with two whitish hyaline indentations, separated by a dark oblique cross-band, which is emitted from another dark brown band crossing the wing and covering the posterior cross-vein. The apex of the wing is bordered to a little beyond the fourth vein by a dark band, which is narrowly connected anteriorly with the band crossing the wing. The band crossing the wing is connected along the fifth vein with the dark area in the proximal half of the wing. This area extends from the costa posteriorly to the fifth vein and across the base of the third posterior cell, and contains two whitish hyaline spaces. One is in the marginal cell just beyond the tip of the first longitudinal vein; the second is in the first basal cell below the stigma. The base of the wing is whitish hyaline. In the figure the whitish hyaline spaces are too dark.

The generic location of this species is doubtful.

Urellia apicata, n. sp.

Type—Female from Colorado.

Brown; wings hyaline with radiating picture in the apex, stigma coloured. Scutellum with four bristles. Posterior basal cross-vein right angled; small cross-vein two-thirds along the discal cell; third vein with bristles. Length ♀ 6.5 mm., wing 6 mm.

Head—Front yellowish brown, of uniform width and one-third as wide as the head. Lower frontals varying in size and number,



Fig. 35—*Urellia apicata*, wing.

four on one side and five on the other; all bristles brown and more or less pale, cilia of posterior orbit also pale. Cephalon brown. Cheeks rather broad. Oral opening large, margin not projecting. Face retreating, slightly hollowed and clay-

yellow. Antennae short, reaching two-thirds to the arcuate oral margin, third segment with rounded anterior corner; second segment with minute spine; arista brown.

Thorax—Brown; bristles brown, short hair yellowish. First pair of dorso-central bristles one-third from the transverse suture to the scutellum. The latter flat and bearing four bristles, the middle pair being a little the shorter. Halteres brown.

Abdomen—Dark brown, shining; short hair, dark brown. Macrochaetae prominent, brown. Genital segment of the female broad, flat, and brown tipped with black; as long as the last two abdominal segments taken together.

Legs—Light brown with bristles of the same colour. Hind tibia with row of short strong bristles, fore-femora strongly armed as usual.

Wings—Hyaline with the fuscous area in the apex beyond the hind crossvein and above the fourth vein; stigma fuscous. Running posteriorly from the black spot are three rays, two crossing the second posterior cell and one covering the hind cross-vein. The dark area contains two large and three small hyaline spots; a large one just beyond the tip of the second vein

and reaching to the third vein, with a small spot each side on the costal margin; the other large spot is directly below in the first posterior cell on the fourth vein with a small spot on the proximal side.

Hab.—Colorado.

This specimen which has the characteristic wing picture of the genus *Urellia*, differs considerably in structure from other members of that genus which have been examined. Among the constant characters for species having four or two bristles on the scutellum are the following: three lower frontal bristles, narrow cheeks, first pair of dorso-central bristles close to transverse suture, macrochaetae weak, hind tibia without a row of short strong bristles, posterior basal cross-vein obtusely angled, small cross-vein three-fourths along the discal cell, and the third vein bare. The structure of *Urellia apicata* differs from these characters as follows: four or five lower frontal bristles, broad cheeks, first pair of dorso-central bristles one-third from the transverse suture to the scutellum, macrochaetae prominent, hind tibia with a row of short strong bristles, posterior basal cross-vein right angled, small cross-vein only two-thirds along the discal cell, and the third vein with bristles.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Fifty-first Annual Meeting of the Entomological Society of Ontario was held at the Royal Canadian Institute, Toronto, on Thursday and Friday, November 5 and 6, 1914—Dr. C. Gordon Hewitt, President of the Society, occupying the chair throughout the sessions.

Among the members present were Prof. J. H. Comstock, Cornell University, Ithaca, N. Y.; Rev. T. W. Fyles, Ottawa; Dr. C. G. Hewitt, and Messrs. A. Gibson and J. M. Swaine, Entomological Branch, Ottawa; Messrs. N. Criddle, W. A. Ross, E. H. Strickland and H. F. Hudson, Field Officers of the Branch; Rev. Prof. C. J. S. Bethune, Prof. L. Caesar and Mr. A. W. Baker, O. A. College, Guelph; Prof. W. Lochhead, Macdonald College, Que.; Prof. J. Dearness, London; Dr. A. Cosens, Prof. E. M. Walker and Messrs. J. B. Williams, A. Smith, C. Snazelle, E. H.

Craigie, Geo. Duff and S. Logier, Toronto; Mr. F. J. A. Morris, Peterborough; Mr. J. Evans, Trenton; Prof. W. H. Brittain, Truro, N. S.; and Mr. Vernon King, Charleston, Mo.

Among the visitors were Prof. C. R. Crosby, Cornell University, Ithaca, N. Y.; Mr. J. C. Chapais, St. Denis-en-bas, Que.; Rev. Father Leopold, La Trappe, Que., and Messrs. A. B. Baird and S. H. Hord, O. A. College, Guelph.

On Thursday morning a meeting of the Council was held in the University Biological Building, at which the report of the proceedings during the past year was drawn up, and several matters relative to the welfare of the society were discussed. A suggestion that the next Annual Meeting be held at Ottawa was afterwards put before the General Meeting of the Society and adopted.

The regular proceedings commenced at 2 p.m. in the Lecture Room of the Royal Canadian Institute, and the interest felt by those present in the varied programme was shown by the lengthy discussions which followed many of the papers. The first order of business was the reading of the Reports of the Directors on the insects of the year. Reports were presented by Mr. A. Gibson, Ottawa; Mr. C. E. Grant, Orillia; Dr. A. Cosens, Toronto; Mr. F. J. A. Morris, Peterborough, and Mr. W. A. Ross, Jordan Harbour. These Reports contained an unusual number of interesting observations. Dr. Hewitt, the President, then read the Annual Address, which was a very able and complete account of the rise and progress of Applied Entomology in Canada, and will form a most valuable contribution to our literature of the history of Canadian Entomology. Appreciative remarks upon this address were made by Dr. Bethune and Dr. Fyles, after which a valuable Paper on the Insects of the Season in Ontario was presented by Prof. Caesar. Considerable discussion followed this paper, particularly on the work of the Tarnished Plant Bug and other capsids in orchards and nursery stock and the methods for their control.

On Thursday evening a Public Meeting was held in the Lecture Hall of the University Biological Building, and was well attended, many members of the University staff and that of the

various Collegiate Institutes and of the Royal Canadian Institute having been noticed in the audience.

The President, Dr. Hewitt, introduced the lecturer, Prof. J. H. Comstock, of Cornell University, who gave a most interesting and stimulating address on the "Habits of Spiders," a subject upon which there is probably no one more competent to speak. The lantern illustrations, made from Prof. Comstock's own photographs, were extraordinarily fine examples of insect photography. A vote of thanks, proposed by Prof. Lochhead and seconded by Prof. Dearness, was extended to Prof. Comstock for his instructive and entertaining address. After the lecture an informal gathering took place, at which refreshments were served and a pleasant chat enjoyed by the members and visitors.

On Friday morning the meeting was resumed and continued until late in the afternoon. The Reports of the Council and of the various Officers and Branches of the Society were read and adopted. No Report of the Delegate to the Royal Society was received, owing to the unfortunate death of Mr. Henry H. Lyman, who had been appointed in that capacity. The election of Officers, which then followed, resulted in the re-election of all the officers of the past year, with the exception of the Delegate to the Royal Society, for which Prof. Lochhead was chosen. Two new members were elected—Mr. J. C. Chapais, St. Denis-en-bas, Que., and Rev. Father Leopold, La Trappe, Que.

The following papers were read: "Injurious Insects of Quebec in 1914" and "The Work of Henri Fabre," by Prof. W. Lochhead; "The Outbreak of the Army Worm in Canada in 1914," by Mr. A. Gibson; "The Army Worm in Ontario," by Mr. A. W. Baker; "Variation in Colour of the Bristles of the Hedgehog Caterpillar," *Isia isabella*, by Mr. Gibson; "Mountains and Hills," by the Rev. Dr. Fyles; "Forest and Shade Insects of the Farm," by Mr. J. M. Swaine; "An Imported Red Spider attacking Fruit Trees," and "Cherry Fruit Flies," by Prof. L. Caesar, and "Locust Control in Eastern Canada." by Mr. Gibson.

Special mention should be made of the great pleasure felt by everyone present in listening to Dr. Fyles' charming paper, which

was read by the venerable author himself in his delightful and inimitable style.

The following is a list of the officers of the Society for the ensuing year:—

PRESIDENT—C. Gordon Hewitt, D.Sc., F.R.S.C., Dominion Entomologist, Entomological Branch, Ottawa.

VICE-PRESIDENT—Mr. A. F. Winn, Westmount, Que.

SECRETARY TREASURER—Mr. A. W. Baker, B.S.A., Lecturer in Entomology, O. A. College, Guelph.

CURATOR—Mr. G. J. Spencer, B. A., O. A. College, Guelph.

LIBRARIAN—Rev. Prof. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., Professor of Entomology and Zoology, O. A. College, Guelph.

DIRECTORS—Division No. 1: Mr. Arthur Gibson, Entomological Branch, Ottawa. Division No. 2: Mr. C. E. Grant, Orillia. Division No. 3: Dr. A. Cosens, M.A., Ph.D., Parkdale Collegiate Institute, Toronto. Division No. 4: Mr. C. W. Nash, Provincial Biologist, East Toronto. Division No. 5: Mr. F. J. A. Morris, Peterborough. Division No. 6: Mr. R. S. Hamilton, Collegiate Institute, Galt. Division No. 7: Mr. W. A. Ross, Jordan Harbour.

DELEGATE TO THE ROYAL SOCIETY OF CANADA—Prof. Wm. Lochhead, Professor of Biology, Macdonald College, Que.

AUDITORS—Prof. J. E. Howitt, M.S.A., and Prof. L. Caesar, B.A., M.S.A., O. A. College, Guelph,

CHANGE OF ADDRESS.

Mr. E. P. Van Duzee wishes to call the attention of his correspondents to his recent change of address to "Department of Agriculture, University of California, Berkeley, California."

THE WAVY STRIPED FLEA-BEETLE

(Phyllotreta sinuata Steph.)

BY E. MELVILLE DUPORTE, MACDONALD COLLEGE, QUE.

The fact that this insect has not before been reported as a pest in Canada serves as an excuse for the publication of a short note concerning it.

Phyllotreta sinuata is an introduced species and is generally distributed throughout England and the continent of Europe. Horn in 1889 describes it as occurring in America from the New England States to Georgia and westward to Missouri. Sanderson states that in the Middle States the larvæ mine in the leaves of wild pepper grass (*Lepidium virginicum*) and Professor Blatchley informs me that it is a very common species throughout Indiana.

My attention was first drawn to the insect in June, 1913, when the larvæ were observed mining in the leaves of cress and feeding on the foliage of radish. The adults were obtained by rearing these larvæ and were also collected in the field. The cress was practically destroyed by the beetle and its larvæ.

The insect is again present at Macdonald College this season feeding on radish, turnips and cabbage. It is often associated with the turnip flea-beetle (*Phyllotreta vittata* Fab.) and it is probably owing to its close resemblance to this species that it has escaped detection, for recently, in examining a collection of *P. vittata* which was made in 1912, I found several specimens of *P. sinuata* which I had not noticed at the time they were collected.

The larva of *P. sinuata* is a small eruciform grub, about 4 mm. long. The head and pronotum are dark brown, the latter being crossed by a light-coloured median line. The second and third thoracic segments as well as the first eight abdominal segments bear several brown setigerous tubercles of various sizes. The last abdominal segment is deep brown or black and fringed

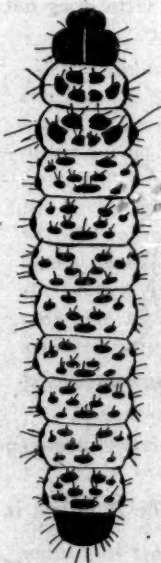


Fig. 36—*Phyllotreta sinuata* Steph., larva.

December, 1914

with lighter coloured setæ. The general colour is green, owing to the chlorophyll of the leaf on which it feeds.

The pupa is yellow and is found in a small cell in the soil around the affected plants.

The adult is an elongate oval beetle, piceous. Elytron with narrow yellow sinuate vitta. Head punctulate, thorax and elytron punctate. Antennæ not quite half as long as body, joint 4 in the male equal in length but much wider than joint 2 or 3, joint 5 longer than the preceding two and much dilated. Except for the broad post-humeral branch, the vitta is almost uniform in width throughout; the distal portion is usually very slightly wider than the middle portion, but quite often the width is practically uniform throughout; the proximal portion of the vitta does not bend towards the suture, but is almost parallel to it.

Length 2.5 mm.



Fig. 37—*Phyllotreta sinuata*
Steph., male.



Fig. 38—*Phyllotreta vittata*
Fab., male.

The following are the chief points of difference between *P. sinuata* and *P. vittata*.

1. *P. sinuata* is larger, measuring 2.5 mm., while *P. vittata* is 2.0 mm. long.
2. In *sinuata* the length of the antennæ is quite equal to half that of the body, but in *vittata* it is somewhat greater.
3. The fifth antennal joint of the male in *sinuata* is very much broader than the preceding joint and slightly longer than the combined length of joints 3 and 4, while in *vittata* the corres-

ponding joint is but slightly broader than the preceding ones and not as long as joints 3 and 4.

4. In *sinuata* the basal portion of the vitta is nearly parallel to the suture, and the middle portion very little or not at all narrower than the distal, while in *vittata* the basal portion bends towards the suture and the middle portion is decidedly narrower than the distal.

5. In *sinuata* the prothorax is twice as wide as it is long, while in *vittata* its width is only about one-third greater than its length.

A SPECIES OF MEGASTIGMUS REARED FROM LARCH SEEDS.*

BY S. MARCOVITCH, ITHACA, N. Y.

On September 10, 1913, the seeds of the larch trees, *Larix laricina* Du Roi, around the Cornell insectary, Ithaca, N. Y., were found to be infested by a white larva. The seeds were kept indoors during the winter, and on April 2, 1914, the first adults of a species of *Megastigmus* emerged. The larva completely devours the kernel, and fills the entire seed making it difficult to open one without injuring the larva. Examined on July 17, the larvae were nearly two-thirds grown. That it feeds on the kernel as do all of the known American forms of this genus is quite conclusive, since only one kind of larva was found in the seeds. This species is apparently undescribed.

Megastigmus laricis, n. sp.

Female.—Length 2.1 mm.; abdomen 1 mm.; ovipositor 1.6 mm. General colour black; face, front nearly to base of the antennae yellowish; occiput, antennal grooves, and vertex, black; posterior eye-margin and cheeks, dark brown. Prothorax black, and finely rugulose. Anterior portion of mesonotum smooth, posterior part with fine transversely curved striae. Scutellum finely rugulose. Propodeum finely reticulate-punctate with a medium longitudinal carina, which is broken in the middle. Antennae brown, scape yellowish. Anterior coxae yellow; middle coxae brownish yellow; posterior coxae black; rest of legs brownish yellow, except femora,

*Contribution from the Entomological Laboratory of Cornell University.
December, 1914

which are brownish black, but lighter at the tip. Wings hyaline. Abdomen shining black, sometimes with three indistinct yellow spots on the sides. Ovipositor brownish black.

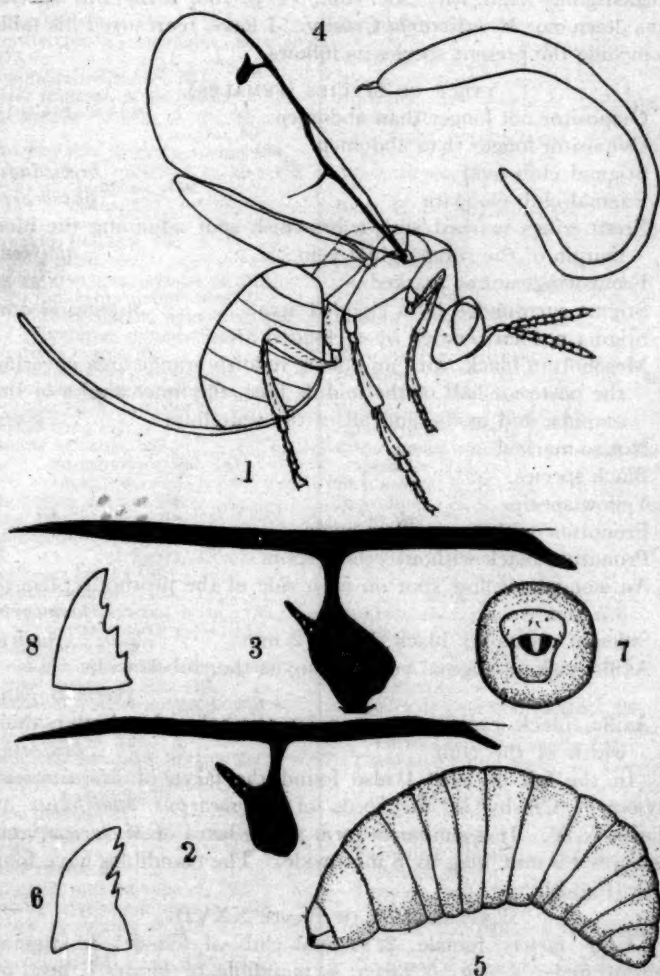
Male.—Length 2.5 mm.; abdomen 1 mm. Vertex and occiput black; face, cheeks and upper portion of front, yellow; portion bordering the upper posterior angle of the eye brownish. Whole dorsal aspect of thorax black. The brownish spot on the sides of the prothorax somewhat rectangular, and more distinct than in the female. Antennae brownish, scape yellow. Front coxae yellow; middle coxae brownish, black towards base; hind coxae black. Legs yellowish. Stigmal club somewhat truncate behind. Propodeum finely reticulate-punctate with an indistinct longitudinal median carina. Abdomen brownish black, lighter beneath.

Larva.—Length 2.1 mm.; width 9 mm. Colour dull white, middle segments a little darker. The mandibles are brownish, and armed with four teeth (Fig. 6). Supporting the mandibles is a thick fleshy labium, thicker on the caudal end. The larva is sparsely clothed with short setae.

Egg.—The egg as obtained by dissection of the female is white, smooth, and spindle-shaped, with a long pedicel at one end, and a vestige of one at the opposite end. Length of body of egg .22 mm.; tail-like process .44 mm.; vestige .031 mm.

Described from 15 females and 12 males, Ithaca, N. Y., July 17, 1914. Types deposited in the Cornell University collection.

Specimens were compared with *Megastigmus atedius* Walker in the Oxford Museum by C. O. Waterhouse. The latter is 4 mm. long; the striae of the thorax are coarser, and the stigmal club is nearly circular. Specimens were also compared with *Megastigmus japonicus* and *Megastigmus koebelei* Ashmead, by J. C. Crawford in the U. S. National Museum. *M. japonicus* is entirely yellow. The striae of the mesonotum are coarser and straight. They are much more strongly elevated than in *laricis*, and continue across the parapsoidal areas. *M. koebelei* has the dorsum of the thorax green, with the transverse striae much coarser. The parapsoidal furrows are indistinct, and the apical part of the scutellum has a finer sculpture than the basal part.



MEGASTIGMUS LARICIS, N. SP.

According to Crosby's table of the North American species of *Megastigmus* (Ann. Ent. Soc. Am., VI, p. 156, 1913) this species runs down to *M. lasiocarpi* Crosby. I have rearranged his table to include the present species as follows.

TABLE OF SPECIES (FEMALES).

1. Ovipositor not longer than abdomen.....	2
Ovipositor longer than abdomen.....	3
2. Stigmal club oval	<i>brevicaudis</i>
Stigmal club elongate	<i>physocarpi</i>
3. Front wings marked with a brownish spot adjoining the hind margin of the submarginal vein.....	<i>albifrons</i>
Front wings not so marked.....	4
4. Stigma surrounded by a clouded area.....	<i>nigrovariegatus</i>
Stigma not surrounded by a clouded area.....	5
5. Mesonotum black, with an oblong reddish orange area covering the posterior half of the middle lobe, the inner angles of the scapulæ and axillæ and all of the scutellum.....	<i>pinus</i>
Not so marked.....	6
6. Black species.....	7
Yellow species.....	9
7. Pronotum with two yellow spots.....	<i>tsugæ</i>
Pronotum black without yellow spots.....	8
8. An elongate yellow spot on each side of the prothorax; length 3.7 mm.	<i>lasiocarpi</i>
Sides of prothorax black; length 2 mm.....	<i>laricis</i>
9. Axillæ yellow; stigmal vein as long as the club is wide	<i>spermatophus</i>
Axillæ black except inner angle; stigmal vein shorter than width of the club.....	<i>aculeatus</i>

In the fall of 1913 I also found the larva of *Megastigmus physocarpi* Crosby in the seeds of *Physocarpus opulifolius* at Ithaca, N. Y. It is similar in form to the larva of *M. laricis*, and measures 1.9 mm. long by 8 mm. wide. The mandibles have four teeth (Fig. 8).

EXPLANATION OF PLATE XXVII.

1, *M. laricis*, female; 2, stigmal club of female; 3, stigmal club of male; 4, egg; 5, larva; 6, mandible of larva; 7, head of larva from in front; mandible of larva of *M. physocarpi*.

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